



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/798,951	03/12/2004	Sung-Yueh Shieh	L9079.04102	7727
24257	7590	03/23/2006	EXAMINER	
STEVENS DAVIS MILLER & MOSHER, LLP			PERRY, ANTHONY T	
1615 L STREET, NW			ART UNIT	
SUITE 850			PAPER NUMBER	
WASHINGTON, DC 20036			2879	

DATE MAILED: 03/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/798,951

Applicant(s)

SHIEH ET AL.

Examiner

Anthony T. Perry

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/12/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities: pages 5 and 6 list specific compositions of phosphors suitable for the blue phosphor. The list includes $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}^{2+},\text{Mn}^{2+}$ as one of the blue phosphors. However, it is believed that $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}^{2+},\text{Mn}^{2+}$ is a BAM green phosphor.

Appropriate correction is required.

Claim Objections

Claims 7 is objected to because of the following informalities: change "while light" to --white light-- in line 1. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitations "the secondary light excitation" in lines 1-2, "the light emitting component" in line 2, "the first blue phosphor" in line 4, "the light of the first spectrum" in line 4, 5, and 6, "the second yellow phosphor" in line 5, "the light of the secondary spectrum" in lines 5-6 and 6-7. There is insufficient antecedent basis for these limitations in the claim.

Claim 4 recites the limitation "the color temperature" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Art Unit: 2879

Claim 5 recites the limitation "the light source of different colors" in lines 1-2 and "the packing layer" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Regarding claims 6-15, claim 6 lists specific compositions of phosphors suitable for the blue phosphor. The list includes $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}^{2+}, \text{Mn}^{2+}$ as one of the blue phosphors. However, it is believed that $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}^{2+}, \text{Mn}^{2+}$ is a BAM green phosphor. Common BAM blue phosphors include $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}^{2+}$ and $\text{BaMg}_2\text{Al}_{16}\text{O}_{27}:\text{Eu}^{2+}$. Appropriate correction is required.

Claim 10 recites the limitation "the green phosphor" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitation "the green phosphor" in lines 5 and 15. There is insufficient antecedent basis for this limitation in the claim.

Regarding claims 12-15, claims 12-13 state that a blue phosphor is included in the second coating layer but the equations state that 0% blue phosphor can be included in the second coating layer. For purposes of treating the claims on their merits the examiner has interpreted the claims to read that blue phosphor is optionally included in the second coating layer and is not required. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2 and 4-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Danielson et al. (WO 02/11173 A1).

Regarding claims 1-2 and 4-5, Danielson teaches red, green, blue, and yellow emitting phosphors (6) in a packing layer (5) used in combination with a near UV emitting LED (1) to produce white light and therefor teaches method for producing a white light emission by means of the secondary light excitation, wherein the light emitting component for generating violet or ultra violet light is employed to generate violet or ultra violet light with a wavelength of 400 nm which excites the first blue phosphor to emit the light of the first spectrum, and the light of the first spectrum excites the second yellow phosphor to emit the light of the secondary spectrum, then the light of the first spectrum blends with the light of the secondary spectrum to produce white light emission (see for example Fig. 4a and page 8, lines 3-7). It is noted that it is inherent that the color temperature and color rendering effect of the white light may be adjusted by adjusting the weight proportion of blue phosphor and yellow phosphor.

Claims 1-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Doxsee et al. (US 6,765,237).

Regarding claims 1-4, Doxsee teaches a method for producing a white light emission by means of the secondary light excitation, wherein the light emitting component for generating violet or ultra violet light is employed to generate violet or ultra violet light with a wavelength of 410 nm which excites the first blue phosphor to emit the light of the first spectrum, and the light of the first spectrum excites the second yellow phosphor to emit the light of the secondary spectrum, then the light of the first spectrum blends with the light of the secondary spectrum to produce white light emission (see for example Fig. 6 and col. 8, lines 6-24). Doxsee teaches the light-emitting component used as the light source is an ultra violet light emitting diode or laser

Art Unit: 2879

diode (for example, see col. 4, lines 29-35). It is noted that it is inherent that the color temperature and color rendering effect of the white light may be adjusted by adjusting the weight proportion of blue phosphor and yellow phosphor. Furthermore, Doxsee states that the exact color of the device can be modified by changing the concentrations of the individual phosphors (col. 8, lines 22-24).

Regarding claim 5, although Doxsee does not specifically teach packing layer including blue, yellow, red, and green phosphors together, it is noted that the claim just states that red and green phosphors may be added, and therefor red and green phosphors are not required to meet the limitation that "light source of different colors may be obtained by adding proper amount of red phosphor and green phosphor."

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chua et al. (US 6,869,753) in view of Doxsee et al. (US 6,765,237).

Regarding claim 6, Chua et al. teach a white emitting component for producing a white light emission by means of a secondary light excitation comprising a LED chip (60) which emits a first light and a resin packing layer (70) containing a mixture of phosphors coated on the LED chip (66). Chua does not specifically teach a UV LED used with a resin packing layer containing blue and yellow phosphors, but does teach the use of a blue light emitting LED used

Art Unit: 2879

with a resin packing layer containing a yellow phosphor, such as $\text{Y}_3\text{Al}_5\text{O}_{12}:\text{Ce}^{3+}$ (for example, see Fig. 3C and col. 4, line 5 – col. 5, line 4).

Doxsee et al. teach that using a UV (380 – 420 nm) LED chip instead of a blue light emitting LED provides a superior color performance since the UV chip does not appreciably contribute to the visible color of the LED (for example, see col. 1, line 61 – col. 2, line 37). Doxsee teaches a white light emitting component made of a UV LED chip and a blue and yellow phosphor blend as an alternative to the blue LED and yellow phosphor assembly. Doxsee teaches $\text{Sr}_5(\text{PO}_4)_3\text{Cl}:\text{Eu}^{2+}$ as an acceptable blue phosphor for the phosphor blend (col. 2, line 66). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a UV LED chip instead of the blue LED chip and to provide the blue phosphor, $\text{Sr}_5(\text{PO}_4)_3\text{Cl}:\text{Eu}^{2+}$, along with the yellow phosphor, $\text{Y}_3\text{Al}_5\text{O}_{12}:\text{Ce}^{3+}$, of the Chua reference so as to provide a white light emitting component that has improved color control and acceptable luminous efficacy.

Claims 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chua et al. (US 6,869,753) in view of Doxsee et al. (US 6,765,237) as applied to claim 6 above, and further in view of Danielson et al. (WO 02/11173 A1).

Regarding claims 7-9, Chua et al. state that the phosphor layer (70) can be a combination of yellow, red, green, and blue phosphors, wherein $\text{SrS}:\text{Eu}^{2+}$ is suitable as a red phosphor and $\text{BaAl}_2\text{S}_4:\text{Eu}^{2+}$ is suitable as the green phosphor (col. 4, lines 41-53). It is well known that a combination of only two color light spectrums cannot provide a white light source with a high color rendering index (CRI). Danielson teaches that a UV LED having a phosphor blend including blue, yellow, red, and green phosphors can provide a white light with a high CRI (more than 80%) (page 12, lines 11-16). Accordingly, it would have been obvious to one of

Art Unit: 2879

ordinary skill in the art at the time the invention was made to have added a green and red phosphor to the resin packing layer of the combined teaching of the Chua and Doxsee references.

Regarding claims 10-11, the Chua in view of Doxsee in view of Danielson discloses the claimed invention except for the weight ranges of the different materials (packing material and the individual phosphors). It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide appropriate weight ranges for the different materials of the resin packing layer, since optimization of workable ranges is considered within the skill of the art.

Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chua et al. (US 6,869,753) in view of Doxsee et al. (US 6,765,237) in view of Danielson et al. (WO 02/11173 A1) as applied to claims 7-9, above, and further in view of Mueller-Mach et al. (US 6,696,703).

Regarding claims 12-13, Chua in view of Doxsee in view of Danielson does not specifically teach the resin packing layer having a two-layer structure. However, the use of separate phosphor layers is a well-known alternative to the use of a phosphor blend. For example, Mueller-Mach teaches a two-layer phosphor structure wherein UV light from an LED (2) is converted by a first layer (31) to a color in the visible range and a portion of that light is converted by a second layer (33) to another color in the visible range and the combination of the two produce white light (for example, see Fig. 4). Mueller-Mach teaches that such a separate layer structure provides a method for reducing color variations in phosphor-converted LED devices, thereby providing a means for ensuring the uniformity in the quality of the colored light produced (see Abstract). Accordingly, at the time the invention was made, one of ordinary skill

Art Unit: 2879

in the art would have reasonably contemplated using a two layer structure as taught by Mueller-Mach so as to ensure the uniformity of the white light.

The Chua in view of Doxsee in view of Danielson in view of Mueller-Mach discloses the claimed invention except for the weight ranges of the different materials (packing material and the individual phosphors). It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide appropriate weight ranges for the different materials of the resin packing layer, since optimization of workable ranges is considered within the skill of the art.

Regarding claims 14-15, Chua et al. teach the packing material being a silicone gel and teach a layer of silicone in the form of a lens formed on top of the packing layer (for example, see col. 5, lines 29-39).

The reason for combination in the rejection of claims 12-13 applies.

Other Prior Art Cited

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kawana et al. (US 7,006,172), Odaki (US 6,982,523), and Soules et al. (US 6,580,097) provide evidence that $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}^{2+},\text{Mn}^{2+}$ is a green phosphor.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to *Anthony Perry* whose telephone number is (571) 272-2459. The examiner can normally be reached between the hours of 9:00AM to 5:30PM Monday thru Friday.

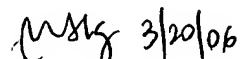
Art Unit: 2879

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (571) 272-24597. **The fax phone number for this Group is (571) 273-8300.**

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Anthony Perry
Patent Examiner
Art Unit 2879
March 17, 2006



Mariceli Santiago
Primary Examiner
Art Unit 2879